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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellants: Hanson et al.
Filing Date: 11/20/2001
For: NON-VISIBLE LIGHT DISPLAY
ILLUMINATION SYSTEM AND
METHOD
Group Art Unit: 2875
Docket No.: 035451-0145
Application No.: 09/989,273
Examiner: Hargobind S. Sawhney

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Roberta A. Cooper (Printed Name)	
 (Signature)	

BRIEF ON APPEAL TRANSMITTAL

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Commissioner of Patents
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Sir:

Transmitted herewith is the following document for the above-identified patent application.

[X] Brief on Appeal (20 pages) (in triplicate).

[X] Check number 14233 in the amount of \$330.00 covering the Rule 17(c) appeal fee.

Respectfully submitted,

Date

6/30/2004

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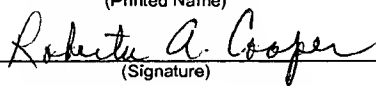


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BRIEF ON APPEAL

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This paper is being filed in response to the final Office Action dated November 3, 2003 (finally rejecting Claims 1-4, 6-19, 22, and 24-27). The Notice of Appeal was filed on April 30, 2004. Appellants respectfully request reconsideration of the application.

Under the provisions of 37 C.F.R. § 1.192, this Appeal Brief is being filed in triplicate together with a check in the amount of \$330.00 covering the Rule 17(c) appeal fee. If this fee is deemed to be insufficient, authorization is hereby given to charge any deficiency (or credit any balance) to the undersigned deposit account 06-1447.

REAL PARTY IN INTEREST

This application has been assigned of record to Palm, Inc. having a place of business at 5470 Great America Parkway, Santa Clara, California 95052. The assignment was recorded in the records of the United States Patent and Trademark Office at Reel/Frame 012317/0823 on November 20, 2001.

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RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

This is an appeal from the final Office Action dated November 3, 2003, finally rejecting Claims 1-4, 6-19, 22, and 24-27. Claims 5, 20, 21, and 23 were cancelled without prejudice in a reply dated January 3, 2003 in response to an Office Action dated October 7, 2002. Claims 1-4, 6-19, 22, and 24-27 are therefore on appeal.

STATUS OF AMENDMENTS

No claims have been amended subsequent to the mailing date of the final Office Action dated November 3, 2003.

SUMMARY OF INVENTION

The present invention relates generally to the field of electronic displays (See Specification, page 1, paragraph [0001]). In conventional electronic displays, light emitting diodes (LEDs), cold cathode fluorescent lamps (CCFLs), or the like, are used to provide illumination to the displays (See Specification, page 1, paragraph [0002]). The LEDs or other visible light sources may be distributed around the perimeter of the LCD layer, and because the LEDs conventionally emit visible light, the LEDs may produce hot spots, or portions of the display which appear to be more highly lit, washed out, or which generally show uneven illumination of the display (Id.).

In accordance with the present invention, a display system (100) includes a light source (110) which may be a light emitting diode (LED) or other type of light source capable of providing electromagnetic radiation having wavelengths in the non-visible spectrum (that is, approximately having wavelengths less than 430 nanometers (nm) or greater than 690 nm) (See Specification, page 4, paragraph [0016] and Figure 1). Utilizing a non-visible light source has the advantage of not causing the appearance of visible light emanating from a point source, and thereby avoiding gradation problems, hot spots, and/or general uneven illumination (See Specification, page 5, paragraph [0018]).

Display system (100) also includes an LCD layer (130) that provides images thereon in response to electronic input and may be any of a variety of other types of displays such as

E-paper displays, reflective displays, and transfective displays, etc. (See Specification, page 5, paragraph [0019] and Figures 1 and 3).

Display system (100) further includes a reflective layer (140) which receives non-visible light from light guide (120) and converts the received non-visible light into visible light (Id.). Reflective layer (140) includes a phosphorescent and/or a fluorescent coating on the surface of layer (140) which both converts and reflects visible light through LCD layer (130) and through light guide (120) to a viewer's eye (Id.).

In use, light is created by applying an electrical charge to light source (110) to produce a non-visible light (111) (See Specification, page 6, paragraph [0021] and Figure 3). Non-visible light (111) enters light guide (120) and is reflected through LCD layer (130) to reflective layer (140), which converts non-visible light (111) into a visible light and disperses the visible light in a multiplicity of directions (e.g., directions (145) and (146)) (Id.). Light from reflective layer (140) is either transmitted or absorbed by LCD layer (130) to form an image as seen by a user (150) (Id.).

It should also be noted that while Figures 1-4 of the present application illustrate an example of a "front light system," Figures 5A-5B illustrate an example of a "back light system," which is described at paragraphs [0023]-[0024] of the present Specification.

ISSUES

Two issues are presented in this appeal, and are concisely described in the following numbered paragraphs:

1. Whether Claims 1-4, 6-9, 17-19, 22, and 24-27 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 5,982,092 to Chen in view of U.S. Patent No. 4,142,781 to Baur et al. and further in view of U.S. Patent No. 6,366,409 to Umemoto et al.
2. Whether Claims 10-16 are unpatentable under 35 U.S.C. § 103(a) over Chen in view of Umemoto et al.

GROUPING OF CLAIMS

The grouping of the claims is as follows:

Claims 1-4 and 6-9 are grouped together as being directed to a lighting system for a display.

Claims 10-16 are grouped together as being directed to a method of producing an image on a display.

Claims 17-19, 22, and 24-27 are grouped together as being directed to a display system.

To the extent that the claims in these groups are argued separately below, the claims do not stand or fall together.

ARGUMENT

I. LEGAL STANDARDS

Claims 1-4, 6-19, 22, and 24-27 have been rejected under 35 U.S.C. § 103(a), which states:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The legal standards under 35 U.S.C. § 103(a) are well-settled. Obviousness under 35 U.S.C. § 103(a) involves four factual inquiries: 1) the scope and content of the prior art; 2) the differences between the claims and the prior art; 3) the level of ordinary skill in the pertinent art; and 4) secondary considerations, if any, of nonobviousness. See Graham v. John Deere Co., 383 U.S. 1, 148 U.S.P.Q. 459 (1966).

In proceedings before the Patent and Trademark Office, the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art. In re Piasecki, 745 F.2d 1468, 1471-72, 223 U.S.P.Q. 785, 787-88 (Fed. Cir. 1984). “[The Examiner] can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references.” In re Fritch, 972 F.2d 1260, 1265, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992).

As noted by the Federal Circuit, the “factual inquiry whether to combine references must be thorough and searching.” McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 60

USPQ.2d 1001 (Fed. Cir. 2001). Further, it “must be based on objective evidence of record.” In re Lee, 277 F.3d 1338, 61 USPQ.2d 1430 (Fed. Cir. 2002). The teaching or suggestion to make the claimed combination must be found in the prior art, and not in the applicant’s disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ.2d 1438 (Fed. Cir. 1991). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ.2d 1430 (Fed. Cir. 1990). “It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to ‘[use] that which the inventor taught against its teacher.’” Lee (citing W.L. Gore v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983)).

II. REJECTION OF CLAIMS 1-4, 6-9, 17-19, 22, and 24-27 UNDER 35 U.S.C. § 103(a) OVER Chen in view of Baur et al. and Umemoto et al.

In the final Office Action dated November 3, 2003, Claims 1-4, 6-9, 17-19, 22, and 24-27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,982,092 to Chen in view of U.S. Patent No. 4,142,781 to Baur et al. and further in view of U.S. Patent No. 6,366,409 to Umemoto et al.

For the reasons given below, the Appellants submit that the rejection of Claims 1-4, 6-9, 17-19, 22, and 24-27 is improper and should be reversed.

A. The Examiner’s Rejection of Claims 1-4, 6-9, 17-19, 22, and 24-27 Should be Reversed Because There is No Suggestion to Combine the Teachings of Chen, Baur et al. and Umemoto et al.

To establish a prima facie case of obviousness based on a combination of prior art references under 35 U.S.C. § 103(a), the Examiner must first show that there is a suggestion or motivation to combine the teachings of those references. This may come in the form of some objective teaching in the prior art or, alternatively, knowledge generally available to one of ordinary skill in the art at the time of the invention that would lead that individual to combine the relevant teachings of the references.

When the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the Examiner to explain why the combination of the teachings is proper. Ex parte Skinner, 2 USPQ.2d 1788 (Bd. Pat. App. & Inter. 1986). In this case, the Examiner has not satisfied the burden of establishing that one of ordinary skill in the art would be motivated to combine the teachings of Chen, Baur et al. and Umemoto et al.

For example, in combining the teachings of Chen with those of Baur et al., the Examiner stated in the final Office Action dated November 3, 2003:

On the other hand, Baur et al. ('781) discloses an electro-optical display device (Figure 9) comprising a fluorescent plate 1a, and an additional a layer 25 containing phosphorescent particles (Figure 9, column 9, lines 5-10). Baur et al. ('781) further teaches the phosphorescent particles embedded in the layer metallic coating (Column 8, lines 17-20).

It would be have been obvious to one of ordinary skill in the art at the time of the invention to modify the lighting system of Chen ('092) by providing the layer containing phosphorescent particles as taught by Baur et al. ('781) for the benefits and advantages of providing afterglow of the display after the device in [sic] switched-off.

While Baur et al. describes the fact that the use of a "fluorescent plate 1a" such as described in the specification thereof will result in an "afterglow of the display" (see, e.g., column 9, lines 18-21), it is unclear how this statement provides a motivation to combine the teachings of Baur et al. with those of Chen. Instead, this statement merely suggests that one advantage described in Baur et al. may also be obtained if a component of Baur et al. (e.g., the "fluorescent plate 1a") were substituted for a component of Chen (e.g., the "fluorescent pigment layer 50").

However, the Examiner has not provided any indication as to how the device disclosed in Chen would have to be modified to accommodate the "fluorescent plate 1a" of Baur et al., or how such "fluorescent plate 1a" would work with the device disclosed in Chen. For example, while the "fluorescent pigment layer 50" of Chen acts to "convert the wave length of incident exciting light emitted by the luminescent crystal 40" (column 3, lines 2-3), such as "ultra violet rays," there is no teaching or suggestion in Baur et al. that the "fluorescent plate 1a" would also be able to convert the wavelength of invisible light. Thus, it is unclear as to whether simply replacing the "fluorescent pigment layer 50" of Chen with the "fluorescent plate 1a" of Baur et al. would allow the device of Chen to function in the same manner. The Examiner has selected elements, from otherwise unrelated references, to make a combination that is unsupported by the actual teachings of such references. Further, the Examiner has not shown that there is any reasonable expectation of success in making such a combination, since the Examiner has not shown that the "fluorescent plate 1a" would

be able to “convert the wave length” of the “ultra violet light” disclosed in Chen in the manner suggested by the Examiner.

Similarly, the Examiner has not provided any indication as to how the device described in Chen would have to be modified in order to accommodate the various features selected from Umemoto et al. Instead, the Examiner has simply noted that “It would have been obvious . . . to combine lighting system of Chen . . . with the display layer – LCD – and its positioning as taught by Umemoto for the benefits and advantage of providing a display system with a lighting system having long operational life, energy efficiency, and steady illumination.” Instead of indicating how the various features of Umemoto et al. relied upon by the Examiner (shown, for example, in Figures 3 and 4, and described at column 15, lines 5-7) could be incorporated into the structure disclosed in Chen, the Examiner has simply selected certain elements in order to make an asserted combination. Such statements, however, do not evince the “thorough and searching inquiry” required by the U.S. Court of Appeals for the Federal Circuit. McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 60 USPQ.2d 1001 (Fed. Cir. 2001). Instead, it appears that the combination of references relied upon by the Examiner is based on improper hindsight reasoning, using the Appellants’ own disclosure as a roadmap in an attempt to render the present claims obvious.

The Appellants respectfully request reversal of the rejection of Claims 1-4, 6-9, 17-19, 22, and 24-27 over the combination of Chen, Baur et al., and Umemoto et al., since the Examiner has not satisfied the initial burden of showing that one of ordinary skill in the art at the time of the invention would have been motivated to combine the teachings of such references in the manner suggested by the Examiner.

B. The Examiner’s Rejection of Claims 1-4, 6-9, 17-19, 22, and 24-27 Should be Reversed Because the Combination of Chen, Baur et al., and Umemoto et al. Does Not Teach or Suggest At Least One Element of Each of the Rejected Claims

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). Even if Chen, Baur et al., and Umemoto et al. could be properly combined, the combination of these references does not teach or suggest at least one element of each of Claims 1-4, 6-9, 17-19, 22, and 24-27. Accordingly, the rejection of these claims under 35 U.S.C. § 103(a) is improper and should be reversed.

1. Claims 1-4 and 6-9

Independent Claim 1 recites a “lighting system for a display” that includes, among other limitations, “a reflective layer having phosphorescent coatings in a substrate, the phosphorescent coated surface reflecting the invisible light from the light source and converting the invisible light into visible light visible to the human eye.”

Thus, Claim 1 requires the presence of a reflective layer having a phosphorescent surface that both (1) reflects the invisible light and (2) converts the invisible light into visible light. None of the cited references teaches or suggests such a layer.

For example, Chen relates to a “light emitting diode planar light source” that includes a “light conductive plate 10,” “luminescent crystals 40,” a “light reflection layer 30” and a separate “fluorescent pigment layer 50” (Chen, column 3, lines 9-21). In the event that the “luminescent crystals 40” emit ultra violet rays, a separate “filter layer 60 must be applied on the light conductive plate 10 for filtering away the ultra violet rays and allowing the visible light to pass” (Chen, column 3, lines 32-39).

The Appellants note that in the Advisory Action dated April 5, 2004, the Examiner indicated that “Chen (‘092) discloses a reflective layer have a fluorescent coating instead of a phosphorescent coating in a substrate as claimed by the applicant.” The Appellants submit that this is an incorrect characterization of the disclosure of Chen. There is no teaching or suggestion that the “fluorescent pigment layer 50” is a “coating.” In contrast, Chen states that the “fluorescent pigment layer 50 is interposed between the light conductive plate 10 and the light reflection layer 30” (column 2, line 67 – column 3, line 1). Thus, the disclosure of Chen would appear to suggest that the “fluorescent pigment layer 50” is a separate layer, rather than a coating. That is, the “light reflection layer 30” and the “fluorescent pigment layer 50” appear to be two separate components of the device described in Chen, as opposed to a “phosphorescent coated surface” such as that recited in independent Claim 1.

Chen does not teach or suggest a reflective layer having a “phosphorescent coated surface” that both (1) reflects the invisible light and (2) converts the invisible light into visible light, as required by independent Claim 1. In contrast, Chen discloses a separate “fluorescent pigment layer 50” that “converts the wave length of incident exciting light emitted by the luminescent crystal” (Chen, column 3, lines 2-3). The light passing through the “fluorescent pigment layer 50” of Chen is then reflected by the “light reflection layer 30.”

There is no teaching or suggestion in Chen to provide a single reflection layer that includes a phosphorescent surface that both reflects and converts invisible light to visible light.

Nevertheless, in the final Office Action dated November 3, 2003, the Examiner stated:

On the other hand, Baur et al. ('781) discloses an electro-optical display device (Figure 9) comprising a fluorescent plate 1a, and an additional a layer 25 containing phosphorescent particles (Figure 9, column 9, lines 5-10). Baur et al. ('781) further teaches the phosphorescent particles embedded in the layer metallic coating (Column 8, lines 17-20).

It should be noted that the Examiner does not describe any teaching or suggestion in either Baur et al. or in Chen to provide a single layer that both reflects invisible light and converts invisible light to visible light. Even if the “fluorescent plate 1a” and “layer 25 containing phosphorescent particles” disclosed in Baur et al. were substituted for the “fluorescent pigment layer 50” of Chen, such a device would still not meet the limitations recited in independent Claim 1. Both the “fluorescent plate 1a, and an additional layer 25 containing phosphorescent particles” disclosed in Baur et al. and the “fluorescent pigment layer 50” of Chen are designed to allow light to pass through such layers (see, e.g., Baur et al., column 9, lines 3-21 and Chen, column 2, line 63 – column 3, line 21). Thus, such layers do not reflect invisible light as required by independent Claim 1. Further, if the “fluorescent plate 1a, and an additional a layer 25 containing phosphorescent particles” disclosed in Baur et al. or the “fluorescent pigment layer 50” of Chen did reflect light, there would be no need for the separate “reflection layer 30” disclosed in Chen.

Thus, nothing in Chen or Baur et al. teaches or suggests the use of a single layer that both reflects invisible light and converts invisible light into visible light, as recited in independent Claim 1. The Examiner also has not described any teaching or suggestion in Umemoto et al. to provide such a layer. The Appellants note that the omission of an element (e.g., separate layers for converting and reflecting light) and retention of its function is an indicia of unobviousness. In re Edge, 359 F.2d 896, 149 U.S.P.Q. 556 (C.C.P.A. 1966).

Accordingly, the combination of Chen, Baur et al., and Umemoto et al. does not teach or suggest at least one limitation recited in independent Claim 1. Reversal of the rejection of

independent Claim 1 and its associated dependent Claims 2-4 and 6-9 is therefore respectfully requested.

2. Claims 17-19, 22, and 24-27

Independent Claim 17 recites a “display system” that includes, among other limitations, “a light converter, converting the invisible light to light having a wavelength visible to the human eye, the light converter having metallized coatings on a substrate to reflect visible and invisible light, and the light converter having phosphorescent coatings on the substrate” and a “flexible display layer receiving and transmitting the visible light.”

As described above with respect to independent Claim 1 and its associated dependent claims, the combination of Chen, Baur et al., and Umemoto et al. does not teach or suggest a single layer that both (1) reflects the invisible light and (2) converts the invisible light into visible light. Thus, the combination of Chen, Baur et al., and Umemoto et al. does not teach or suggest the “light converter” recited in independent Claim 17.

Further, the combination of Chen, Baur et al., and Umemoto et al. does not teach or suggest the structure of the “light converter” recited in independent Claim 17. The “light converter” of Claim 17 requires a substrate that has (1) metallized coatings to reflect visible and non-visible light and (2) phosphorescent coatings.

As noted by the Examiner in the Advisory Action dated April 5, 2004, “Chen discloses a reflective layer having a fluorescent coating instead of a phosphorescent coating in a substrate.” While the Appellants disagree with the contention that Chen discloses a reflective layer having a coating applied thereto (see preceding section), the Appellants agree with the Examiner’s statement that Chen utilizes a fluorescent material rather than a phosphorescent material.

The Examiner states in the Advisory Action, however, that (with emphasis added):

On the other hand, Baur et al. ('781) discloses an electro-optical display device (Figure 9) comprising a fluorescent plate 1a, and an additional layer 25 containing phosphorescent particles (Figure 9, column 9, lines 5-10). Baur et al. ('781) further teaches the phosphorescent particles embedded in the layer metallic coating (Column 8, lines 17-20).

The Appellants submit that the above underlined excerpt is an incorrect characterization of the teaching of Baur et al. In contrast to this characterization, Baur et al. states at column 8, lines 10-27 as follows (with emphasis added):

FIG. 6 is a sample embodiment of a fluorescent plate with additional fluorescent excitation by means of a phosphorescing substance so that the device utilizing the plate 1a can be used in the dark. The device consists of a fluorescent plate 1a with mirrored surfaces 2 on three edges, with the fourth edge being free of any mirrored surface. The fluorescent plate 1a is in optical contact with a synthetic material plate 17 in which phosphorescing particles (not illustrated) with long afterglow time, for example zinc sulphide, are embedded. The synthetic plate 17 also has the three mirrored end or edge surfaces. The contact surface between both plates 17 and 1a bears a dichroitic mirror 15 which will pass the phosphorescent light designated by the arrow 18; however, the mirror 15 will reflect the fluorescent light designated by the arrow 19. Thus, the phosphorescent light 18 will enter the fluorescent plate 1 to cause excitement of the fluorescent light therein.

Thus, Baur et al. refers in the above excerpt to a “fluorescent plate 1a” that is “in optical contact with” an entirely separate “synthetic material plate 17 in which phosphorescing particles . . . for example zinc sulphide, are embedded.” There is no teaching or suggestion of the use of “metallized coatings on a substrate to reflect visible and invisible light” as recited in independent Claim 17. Zinc sulphide, for example, not only is a ceramic material (as opposed to a metal), but also is referred to as a “phosphorescing particle” by Baur et al.

It is unclear how Baur et al. teaches or suggests the use of “metallized coatings on a substrate to reflect visible and invisible light.” As noted above, the “dichroitic mirror 15” appears only to reflect “fluorescent light” (see underlined portion of excerpt from Baur et al.). Thus, there is no teaching or suggestion of the use of a metallized coating which reflects both visible and invisible light.

Still further, Claim 17 requires the use of a “display system” that includes not only a “light converter” that converts “invisible light to light having a wavelength visible to the human eye,” but also that is utilized in conjunction with a “flexible display layer receiving

and transmitting the visible light.” There is no teaching or suggestion in any of the cited references to use such a light converter in conjunction with a flexible display.

In the final Office Action dated November 3, 2003, the Examiner stated as follows with regard to the requirement in Claim 17 of a “flexible display layer” (with emphasis added):

However, regarding the amended claims 17 and 19, Chen ('092) teaches the disclosed light source useable for a liquid crystal display (LCD) (Figure 1 and abstract, column 1, lines 17-19). Broad interpretation of the above teaching indicates that the lighting system disclosed by Chen ('092) is equally adequate for transmissive or transreflective LCDs including rigid or flexible display layers well known in the art.

In response to the Appellants' request that the Examiner substantiate the claim that flexible display layers are well known in the art, the Examiner noted in the Advisory Action that “Further, flexible displays are well known in the art including Arledge et al. (US Patent No.: 5,436,744).”

Neither the cited references nor Arledge et al. appear to teach or suggest the use of a “display system” such as that recited in independent Claim 17 that includes not only a “light converter” that converts “invisible light to light having a wavelength visible to the human eye,” but also that is utilized in conjunction with a “flexible display layer receiving and transmitting the visible light.” For example, Chen does not indicate that a flexible display layer may be used with the subject matter disclosed therein. In contrast, Chen describes the invention disclosed therein as an “LED planar light source” (see, e.g., column 2, line 52). The use of the word “planar” suggests that the invention of Chen is not used in conjunction with flexible display layer; in this manner, it appears that Chen teaches away from the use of a flexible display layer such as that recited in independent Claim 17.

In relying on Arledge et al. for a teaching that a flexible display layer was “well known” to those of ordinary skill in the art, the Examiner has not shown that one of ordinary skill in the art at the time of the invention would have been motivated to make the combination that is suggested by the Examiner. Instead, the Examiner has simply taken elements from otherwise unrelated references in an attempt to render the invention recited in Claim 17 obvious.

Most if not all inventions arise from a combination of old elements, and every element of a claimed invention may often be found in the prior art. See In re Rouffet, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998). However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. See id. Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant. See In re Dance, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998); In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984).

The Examiner has not satisfied the burden of establishing that the disclosure of Chen alone or in combination with any of the other cited references teach or suggest the use of a “flexible display layer receiving and transmitting the visible light.” Even if one were to agree that “flexible displays” were “well known” at the time of the invention, the Examiner has not shown that it would have been obvious to modify the devices described in Chen, Bauer et al., and Umemoto et al. in the manner suggested by the Examiner (i.e., to use a “flexible display”).

The rejection of Claims 17-19, 22, and 24-27 should be reversed, because the combination of Chen, Baur et al., and Umemoto et al. does not teach or suggest at least one element of each of these claims.

III. REJECTION OF CLAIMS 10-16 UNDER 35 U.S.C. § 103(a) OVER Chen in view of Umemoto et al.

In the final Office Action dated November 3, 2003, Claims 10-16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,982,092 to Chen in view of U.S. Patent No. 6,366,409 to Umemoto et al.

For the reasons given below, the Appellants submit that the rejection of Claims 10-16 is improper and should be reversed.

A. The Examiner's Rejection of Claims 10-16 Should be Reversed Because There is No Suggestion to Combine the Teachings of Chen and Umemoto et al.

As described above in Section II.A., the Appellants submit that the Examiner has not satisfied the initial burden of showing that one of ordinary skill in the art at the time of the invention would have been motivated to combine the teachings of Chen and Umemoto et al.

Accordingly, the Appellants respectfully request reversal of the rejection of Claims 10-16 over the combination of Chen and Umemoto et al.

B. The Examiner's Rejection of Claims 10-16 Should be Reversed Because the Combination of Chen and Umemoto et al. Does Not Teach or Suggest At Least One Element of Each of the Rejected Claims

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). Even if Chen and Umemoto et al. could be properly combined, the combination of these references does not teach or suggest at least one element of each of Claims 10-16. Accordingly, the rejection of these claims under 35 U.S.C. § 103(a) is improper and should be reversed.

Independent Claim 10 recites a "method of producing an image on a display" that includes, among other limitations, "generating a source of infrared light, the light having a wavelength in a the infrared spectrum not visible to the human eye . . . [and] converting the infrared light into visible light visible to the human eye."

As acknowledged by the Examiner in the Office Action dated March 31, 2003, "neither in combination nor individually Chen ('092) in view of Umemoto et al. ('409 B1) teaches an LED light source emitting infrared light for display system." Thus, it appears that neither Chen nor Umemoto et al. teach the use of a "source of infrared light" as recited in independent Claim 10. Chen, for example, notes that the "luminescence crystals 40" can be "blue LEDs" (column 3, lines 13-14) or instead may emit "ultra violet rays" (column 3, lines 34-35). There is no teaching or suggestion, however, that the "luminescence crystals 40" of Chen could be used to provide a source of infrared light.

Nevertheless, the Examiner concluded that "It would be have been obvious to one of ordinary skill in the art at the time of the invention to make use of LEDs emitting IR light

instead of UV light emitting diodes, since use of these types of LEDs for a display system is known in the art" (emphasis added).

The Examiner has provided no support for the assertion that the use of LEDs that emit infrared light are "known in the art" (e.g., the Examiner has not cited a single reference that illustrates the fact that IR LEDs are known and used in the display art). As noted in M.P.E.P. § 2143.03, it is never appropriate to rely solely on "common knowledge" in the art without evidentiary support in the record, as the principal evidence upon which a rejection was based. In re Zurko, 258 F.3d at 1385, 59 USPQ2d at 1697. See also In re Lee, 277 F.3d 1338, 1344-45, 61 USPQ2d 1430, 1434-35 (Fed. Cir. 2002) (In reversing the Board's decision, the court stated " 'common knowledge and common sense' on which the Board relied in rejecting Lee's application are not the specialized knowledge and expertise contemplated by the Administrative Procedure Act. Conclusory statements such as those here provided do not fulfill the agency's obligation. The board cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but must set forth the rationale on which it relies.").

The Examiner also has provided no support for the assertion that the "luminescence crystals 40" of Chen could be replaced with the asserted "LEDs emitting IR light." For example, Chen notes that a "filter layer 60 must be applied on the light conductive plate 10 for filtering away the ultra violet rays and allowing the visible light to pass" (column 3, lines 36-40). There is no teaching or suggestion as to what modifications would have to be made to utilize the "LEDs emitting IR light" asserted by the Examiner in conjunction with the device described by Chen. Accordingly, there is no teaching or suggestion in any of the cited references, either alone or in proper combination, to use a "source of infrared light" in conjunction with the other elements recited in independent Claim 10.

Claim 10 also recites "distributing the infrared light over the surface of a reflective layer, the reflective layer including at least one of a phosphorescent and a fluorescent surface" and "reflecting the infrared light from the light source by the reflective layer." In Section 4 of the final Office Action dated November 3, 2003, the Examiner stated that Chen "discloses a lighting system comprising . . . a reflective layer 50 having a fluorescent surface reflecting the IR portion of the invisible light, and converting it to the visible light to the human eye." As described previously, Chen discloses a "fluorescent pigment layer 50" that is interposed between a "light conductive plate 10" and a "light reflection layer 30" (column

2, line 67 – column 3, line 1.” Thus, the “fluorescent pigment layer 50” of Chen acts as a transmissive layer rather than a reflective layer. Further, the “fluorescent pigment layer 50” is a separate layer, as opposed to a “surface” of the “light reflection layer 30.” Accordingly, the Appellants submit that the “fluorescent pigment layer 50” is not a “reflective layer including at least one of a phosphorescent and a fluorescent surface” as recited in independent Claim 10.

The rejection of Claims 10-16 should be reversed, because the combination of Chen and Umemoto et al. does not teach or suggest at least one element of each of these claims.

CONCLUSION

In view of the foregoing, the Appellants submit that:

1. Claims 1-4, 6-9, 17-19, 22, and 24-27 are not properly rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,982,092 to Chen in view of U.S. Patent No. 4,142,781 to Baur et al. and further in view of U.S. Patent No. 6,366,409 to Umemoto et al. and are patentable.

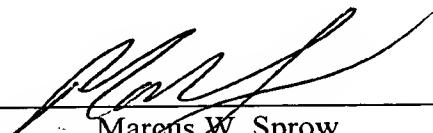
2. Claims 10-16 are not properly rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,982,092 to Chen in view of U.S. Patent No. 6,366,409 to Umemoto et al. and are patentable.

Accordingly, Appellants respectfully request that the Board reverse all claim rejections and indicate that a Notice of Allowance respecting all pending claims should be issued.

Respectfully submitted,

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APPENDIX - THE CLAIMS ON APPEAL

1. A lighting system for a display, comprising:
a light source providing invisible light having a wavelength in a spectrum not visible to the human eye;
a reflective layer having phosphorescent coatings in a substrate, the phosphorescent coated surface reflecting the invisible light from the light source and converting the invisible light into visible light visible to the human eye; and
a display layer in which pixels of the display layer may be altered by applying an electrical charge to the display layer in a controlled manner, the display layer being illuminated by the visible light from the reflective layer,
wherein the light source is located below the display layer opposite the side of the display layer viewed by the human eye.
2. The lighting system of claim 1, wherein the light source includes a light guide.
3. The lighting system of claim 1, wherein the light source provides infrared (IR) light.
4. The lighting system of claim 1, wherein the light source is a single light source.
6. The lighting system of claim 1, wherein reflective layer includes metallized coatings on a substrate.
7. The lighting system of claim 1, wherein the reflective layer includes fluorescent coatings on a substrate.

8. The lighting system of claim 1, wherein the light source includes a light emitting diode (LED).
9. The lighting system of claim 1, wherein the light source provides at least one of ultraviolet (UV) light and infrared (IR) light.
10. A method of producing an image on a display;
generating a source of infrared light, the light having a wavelength in a the infrared spectrum not visible to the human eye;
distributing the infrared light over the surface of a reflective layer, the reflective layer including at least one of a phosphorescent and a fluorescent surface;
reflecting the infrared light from the light source by the reflective layer;
converting the infrared light into visible light visible to the human eye; and
illuminating a display element with the visible light, the display element including individually selectable pixel elements.
11. The method of claim 10, wherein the source of light includes a light emitting diode (LED).
12. The method of claim 10, wherein the display element is a flexible display.
13. The method of claim 10, wherein the source of infrared light is located behind the display element.
14. The method of claim 10, wherein the reflective layer includes a metallized surface.
15. The method of claim 10, wherein the display element is a liquid crystal display element.

16. The method of claim 10, wherein the display element is an electronic paper (e-paper) display element.

17. A display system, comprising:
a light source providing invisible light having a wavelength in a spectrum not visible to the human eye;
a light guide, dispersing the invisible light over a defined region;
a light converter, converting the invisible light to light having a wavelength visible to the human eye, the light converter having metallized coatings on a substrate to reflect visible and invisible light, and the light converter having phosphorescent coatings on the substrate; and
a flexible display layer receiving and transmitting the visible light.

18. The display system of claim 17, wherein the light guide overlays the flexible display layer.

19. The display system of claim 17, wherein the flexible display layer overlays the light guide.

22. The display system of claim 17, wherein the light converter includes fluorescent coatings on a substrate.

24. The display system of claim 17, wherein the light source and light guide combine to form a front lighting system.

25. The display system of claim 17, wherein the light source and light guide combine to form a back lighting system.

26. The display system of claim 17, wherein the light source includes a light emitting diode (LED).

27. The display system of claim 17, wherein the light source provides at least one of ultraviolet (UV) light and infrared (IR) light.